REPORT

on

Metamorphic Rocks in Tasmania

Introduction

This first report on the metamorphic rocks of Tasmania contains only a condensed general account of these rocks.

The greater part of the metamorphic rocks have been formed by regional metamorphism. Contact aureoles are not prominent as far as field investigations have proceeded.

Although no bibliography is attempted in the report, mention must be made of the following papers.

Twelvetrees, W.H. Probable pre-Cambrian strata in Tasmania. Proc. A.A.A.S. 1907.

Ward, L.K. The geology of Tasmania - The pre-Cambrian. Proc. Royal Soc. Tas. 1909.

Regional Metamorphic Rocks.

(a) Proterozoic

The Proterozoic rocks represent the largest area of regionally metamorphosed rocks in Tasmania. They are restricted to the western part of the island and more particularly to the south-western part thereof (see accompanying plan). The largest belt has a general north and south trend with a length of 130 miles and a width ranging from 20 to 30 miles. Six smaller and detached areas occur outside this main belt.

The principal rock types present are mica schists, quartz schists and numerous intermediate varieties of schists. Schistose conglomerates and other beds of magnesian limestones also occur. The above types form over 90 per cent. of the pre-Cambrian rocks of the State.

The mica and quartz schists are present in every district where the pre-Cambrian outcrop. The schistose conglomerates occur at Port Davey, Calders Pass, Goat Island etc. The latter locality is well known for the splendid examples it affords of stretched pebbles in these schistose conglomerates.

Magnesian limestones occur interbedded with the schists along the Arthur River and have been reported by Loftus Hills (Geological Survey Bulletin No. 18) from Albina south of Macquarie Harbour.

All the above types have almost certainly been derived from sedimentary beds consisting originally of gravels, sands, clays and limestones.

In addition to the above, subsidiary amounts of altered basic rocks have been found to occur. The largest area of these types occur in the Rocky River district. Other occurrences are at Collingwood River, Hamilton on Forth, Quamby Brook etc. The prevailing type is an amphibolite, the principal varieties being zoisite and garnet-zoisite-amphibolites. The original rock was apparently a gabbro.

The pre-Cambrian schists have been highly folded or tilted, and recorded dips are usually at high angles. Actual folding (anticlines and synclines) are not detected, but the rocks appear to represent a conformable series dipping in one general direction. This may represent the presence of tilting without folding, or what is more probable the truncation of overfolds.

The strikes are generally very variable due to crumpling but they may be taken generally to have a meridianal direction. The structural features of these rocks has not been worked out in any detail. It is impossible to give even an approximation of their thickness, but it is apparent to any field observer that they must represent a very thick series.

These rocks were originally referred to as pre-Cambrian, but later they were given the more correct term of Algonkian. In conformity with usage throughout the world, they are now spoken of as Proterozoic.

Those rocks were referred to the above age mainly on account of their metamorphism. As the field work extended, it was found that the schists were overlain by sedimentary rocks which could be more or less definitely referred to the Lower Palaeozoic System.

This feature was stressed by L. K. Ward in 1909 (Proc. Royal Soc. Tasmania - The Geology of Tasmania - The pre-Cambrian). Though some of the correlations of Ward's paper are not regarded as correct at the present time, this does not affect the conclusions of the paper quoted above. One point of great interest is that Ward recognised the presence of two series in the Proterozoic.

On the Surveyor's Range, a series of quartzite schists unconformably overlaid a series of quartz and mica schists. This relationship has not been found in any other part of the State, though it would appear in some localities that the quartzite or quartz schists form the upper portion of the Proterozoic and the mica schists the lower portion.

(b) Read Rosebery Schists

These schists have been described by Loftus Hills in Geological Survey Bulletins Nos. 19 and 23. They represent a belt interbedded with the Cambro-Ordovician rocks of the Read-Rosebery district. The original rocks were mainly sedimentary in origin but pyroclastic types were also present.

The series are conformable with the underlying Dundas slate series and the overlying Porphyroid felsites and keratophyres. It is probable that other areas of these schists may occur, but have not yet been mapped. In particular some of the schists of the Low Rocky Point district are probably to be correlated with them.

(c) Mt. Lyell Schists

A narrow belt of schists occur in the mining district of Mount Lyell. The copper lodes of the district are practically confined to the schists. It is probable that these rocks have been produced by intense faulting and also alteration of the original types by mineralising solutions. The schists are described by Prof. J.W. Gregory (The Mount Lyell Mining Field) as chlorite schists, margarodite schists etc.

The original rocks were probably a series of sedimentary ones of Cambro-Ordovician age associated with the Porphyroid series of syenites etc. of the Queen River. Some of the latter have also been rendered schistose probably by the same agencies.

Contact Metamorphic Rocks

The contact aureoles have not been studied to any extent in Tasmania. It is probable that they occur in association with the Devonian intrusions of granites, syenites, gabbros and ultrabasic rocks, particularly in the case of the granites.

The Mesozoic dolerite (diabase) produced only small quantities of metamorphic types. The most altered type is a dark coloured chert, and all gradations through quartzites to partly altered sandstones and mudstones occur. The alteration does not in any case extend far from the dolerite.

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